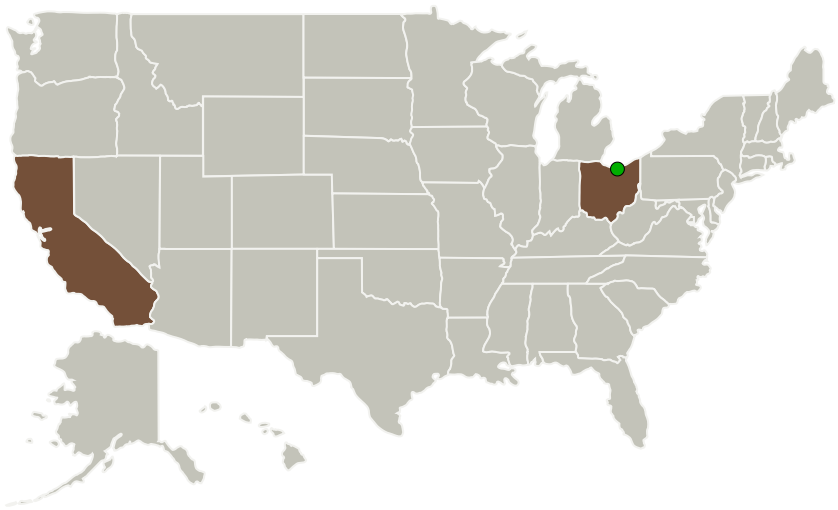
Projection/Reflection Heads-up Display, Phase II

Completed Technology Project (2014 - 2016)

Project Introduction

To address the NASA need for an extravehicular activity (EVA) information display device, Physical Optics Corporation (POC) proposes to advance development of a new Projection/Reflection Heads-up Display (Pro/Ref-HUD) based on innovative integration of liquid crystal display (LCD) screen projectors, partially see-through optical reflectors and unique ergonomic designs. This approach enables the displayed image to meet NASA EVA requirements and is completely decoupled from the user's head while achieving full sunlight readability with automated rapid ambient light response. The Pro/Ref-HUD offers full-color, high-resolution collimated images, with large fields of view, highly suited to the space and weight constraints inside an astronaut's suit. In Phase I, POC successfully demonstrated the feasibility of the Pro/Ref-HUD system by designing, building, and testing a TRL-4 prototype. In this Phase II, POC proposes to develop a fully functional prototype to demonstrate sunlight readability and SXGA resolution, investigate thermal and radiation issues, and analyze ignition safety due to a 100% oxygen operating environment as well as vacuum and extreme temperature environments. The results to be developed and demonstrated in Phase II will offer NASA capabilities to perform EVA operations with heads-up displays internal to the helmet enhancing crew situation awareness, comfort, and safety.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Physical Optics Corporation	Lead Organization	Industry	Torrance, California
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
California	Ohio

Project Transitions

May 2014: Project Start

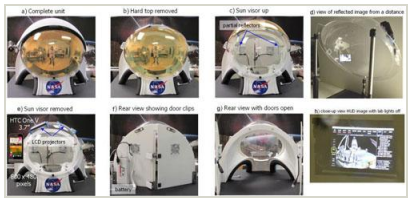
October 2016: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137609)*

Images

Briefing Chart Image
Projection/Reflection Heads-up Display, Phase II *(https://techport.nasa.gov/image/134251)*



Final Summary Chart Image
Projection/Reflection Heads-up Display, Phase II Project Image *(https://techport.nasa.gov/image/132252)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Physical Optics Corporation

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

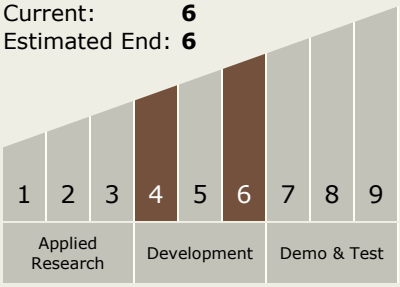
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jason Holmstedt

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.3 Informatics and Decision Support Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System